APPENDIX 9

U.S. FWS comments on 2001 proposed PIWQS. July 24, 2001

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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July 24, 2001

Honorable Alvino Lucero, Governor
(Attn. Environment Department)
Pueblo of Isleta
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Isleta, New Mexico 87022

Dear Governor Lucero:

This letter provides the United States Fish and Wildlife Service (Service) comments on the Pueblo of Isleta proposed amendments to the water quality standards for all surface waters within the exterior boundaries of the Pueblo of Isleta, published in June 2001. The Pueblo of Isleta is located in Bernalillo, Torrance, and Valencia Counties and is approximately 8 kilometers (5 miles) south of Albuquerque, New Mexico. We provide these comments as technical assistance under Section 316 (a) of the Federal Water Pollution Control Act (Clean Water Act) (33 United States Code 1251 - 1376, as amended). However, these comments do not constitute or substitute for any consultation pursuant to the Endangered Species Act of 1973 (16 United States Code 1531-1544, as amended).

We support the adoption of water quality standards that protect the public health and welfare, enhance the quality of water, and achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, for recreation in and on the water, and for restoration and maintenance of the chemical, physical, and biological integrity of surface waters and aquatic ecosystems of the Pueblo of Isleta. We commend the Pueblo of Isleta for providing leadership to other tribes by adopting and monitoring its own water quality standards program as early as 1992. The Service recognizes the inherent rights of tribes to protect their natural resources with water quality standards that are stringent enough to protect the beneficial uses designated by the Pueblo of Isleta. We encourage and support the Pueblo of Isleta's efforts to protect aquatic ecosystems and wildlife through the development and implementation of protective water quality standards.

The Service offers the following specific recommendations.

Fisheries

We recommend the definition of warmwater fisheries in Section VII include the native fishes of the Rio Grande likely found at the Pueblo of Isleta, particularly:

Common Name	Scientific Name
Red shiner	Cyprinella lutrensis
Rio Grande silvery minnow	Hybognathus amarus
Fathead minnow	Pimephales promelas
Flathead chub	Platygobio gracilis
Longnose dace	Rhinichthys cataractae
River carpsucker	Carpiodes carpio
Rio Grande sucker	Catostomus plebeius

Occasionally, efforts to interpret the "fishable/swimmable" goals under the Clean Water Act have been applied only to waters where fish were present or abundant, which can exclude such water bodies as intermittent streams, springs, playas, and seasonal wetlands. While fishes are perhaps the best known group of organisms that are most restricted to water, there are other aquatic communities that thrive in water bodies that should be expressly protected by your designated uses and definitions. The fact that fish are not present in a water body should not mean that the water body may not support aquatic life or be suitable for the propagation of wildlife such as amphibians, water-dependent mammals, and birds. Perhaps the Pueblo of Isleta could consider the substitution of "aquatic life," for the term "fishery" where applicable in the designated uses and definitions sections. Note that the aquatic life criteria would not need to be changed in Appendix II.

We suggest the Pueblo of Isleta consider defining the community of aquatic life as:

> Coldwater Aquatic Life. A stream reach, lake, or impoundment where water temperature and other characteristics are suitable for support and propagation of coldwater-adapted aquatic life, including, but not limited to, individuals or species of green plants, algae, fungi, insects, fish (Rio Grande cutthroat trout, other trouts, chubs, dace, suckers, and walleye), shellfish, snails, frogs, turtles, salamanders, or other aquatic plants and animals.
>
> Warmwater Aquatic Life. A stream reach, lake, or impoundment where water temperature and other characteristics are suitable for support and propagation of warmwater-adapted aquatic life, including, but not limited to, individuals or species of green plants, algae, fungi, insects, fish (red shiner, Rio Grande silvery minnow, fathead minnow, flathead chub, longnose dace, river carpsucker, Rio Grande sucker, or other cyprinids, minnows, carpsuckers, catfish, bullhead, live-bearers, and sunfish), shellfish, snails, frogs, turtles, salamanders, or other aquatic plants and animals.

Wildlife Habitat Use Designation and Wildlife Criteria

The Clean Water Act established national goals of "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable." The Pueblo of Isleta water quality standards address fishery and fish culture use, primary contact and ceremonial use, recreational use, and agricultural uses, but do not explicitly identify a use for the protection and propagation of wildlife. While we think some of the criteria adopted and proposed by the Pueblo of Isleta are clearly protective of wildlife, there is an opportunity to identify "wildlife habitat" as a use to be specifically protected. A "wildlife habitat" designated use could result in additional protection, restoration, and enhancement of wildlife habitat throughout the Pueblo of Isleta. We suggest the following definition for wildlife habitat:

> "Wildlife habitat is a surface water of the Pueblo of Isleta used by plants and animals for water, food, habitat, cover, and/or propagation."

However, unlike the criteria for aquatic life or human health, the United States Environmental Protection Agency (USEPA) has not developed many criteria that are specific for the protection of wildlife (except the Great Lakes guidance described below). Reptiles, turtles (and some other amphibians), aquatic-dependent mammals, and birds, are animals that do not continuously reside in a water body and therefore would not necessarily be classified as aquatic life, nor are they easily available for laboratory studies to derive numeric water quality criteria. We encourage the Pueblo of Isleta to adopt provisions for wildlife habitat that are consistent with (as protective as) the methodology used to derive wildlife criteria in the Final Water Quality Guidance for the Great Lakes System (USEPA 1995), as it will help establish consistent, enforceable, long-term protection of wildlife from all types of pollutants, but can provide short-term emphasis on the persistent, bioaccumulative, and toxic chemicals that accumulate in the food web and may pose a threat to the people and ecosystems of the Pueblo of Isleta. While this guidance was developed for ecosystems of the Great Lakes, the methodology for the derivation of wildlife criteria can be made site-specific to the ecosystems and wildlife found on the Pueblo of Isleta. The formula for deriving wildlife criteria is:

$$WV = \frac{\frac{TD}{UF_A \times UF_S \times UF_L} \times Wt}{W + \sum\left(F_{TLi} \times BAF_{TLi}^{WL}\right)}$$

Where:

WV = Wildlife Value in milligrams of substance per liter (mg/L).
TD = Test Dose in milligrams of substance per kilograms per day (mg/kg-d). for the test species. This shall be a either the "no observed adverse effect level" (NOAEL) or the "lowest observed adverse effect level" (LOAEL) (unitless).
UF_A = Uncertainty Factor for extrapolating toxicity data across species (unitless).
UF_S = Uncertainty Factor for extrapolating subchronic to chronic exposures (unitless).
UFL = Uncertainty Factor for LOAEL to NOAEL extrapolations (unitless).
Wt = Average weight in kilograms for the representative species selected.
W = Average daily volume of water consumed in liters per day (L/d) by the representative species.
F_{TLi} = Average daily amount of food consumed from trophic level *i* in kilogram per day (kg/d) by the representative species.
BAF^{WL}_{TLi} = Bioaccumulation factor (BAF) for wildlife food in trophic level *i* in liters per kilogram (L/kg), developed using the BAF methodology in Appendix B to part 132, Methodology for Development of Bioaccumulation Factors (USEPA 1995).

We recommend that the Pueblo of Isleta adopt this methodology as guidance at this time, identify any representative species, and apply it to persistent, bioaccumulative, and toxic chemicals of concern, such as polychlorinated biphenyls (PCBs), methylmercury, chlorinated dibenzo dioxins, and organochlorine pesticides such as DDT (i.e., dichlorodiphenyl trichloroethane) and its metabolites to protect the Pueblo of Isleta health and welfare. While water quality, in general, has improved recently as a result of improved waste water treatment, nutrients and toxic chemicals continue to be a problem. To secure a safe and healthy aquatic environment, water quality standards can be developed to reduce or eliminate the production, release, and use of persistent, bioaccumulative and toxic chemicals. Persistent, bioaccumulative and toxic chemicals partition into water, sediment, or soil and are not removed at rates adequate to prevent their bioaccumulation in aquatic or terrestrial species. These pollutants travel long distances, transfer rather easily among air, water, and land and linger for generations.

We also suggest that persistent, bioaccumulative, and toxic chemicals be prohibited from any mixing zones. Mixing zones are areas within water bodies where pollutants discharged from pipes are allowed to mix at high concentrations before entering the surrounding water in safe concentrations. Behind the theory of using mixing zones is the belief that by mixing the receiving water within the zone, discharged effluents will become sufficiently diluted to meet applicable water quality criteria beyond the borders of that zone. By prohibiting, or phasing out mixing zones for persistent, bioaccumulative, and toxic chemicals, the National Pollutant Discharge Elimination System permit limitation for these chemicals will be set no higher than the most stringent water quality criteria (in this case, the Pueblo of Isleta's water quality standards for the protection of human health). We recommend the Pueblo of Isleta limit or prohibit mixing zones for certain pollutants, such as PCBs, DDTs, dioxins, and mercury. For

more information on the elimination of mixing zones for persistent, bioaccumulative, and toxic chemicals, please see the USEPA (2000).

Stream Bottom Deposits

Sediment consists of soils, sands, gravel, silt, clay, minerals, and other organic and inorganic materials that have settled on the bottom of a water body. Protecting sediment quality is an important part of your water quality standards. Contaminated sediments can pose serious threats to human health and the environment and are a persistent source of toxic chemicals to humans, wildlife and aquatic organisms. Human, wildlife, and aquatic life exposures result from direct contact, from eating fish or benthos (all the plants or animals living on or closely associated with the bottom of a body water) that have accumulated toxic materials, and from drinking water that has been exposed to contaminated sediments. Aquatic organisms, particularly benthic species, are continuously exposed to the contaminants in sediments, which may result in adverse effects including chronic and acute toxicity. The accumulation of toxic chemicals within aquatic organisms may be sufficient to preclude their use for human consumption and possibly pose a health hazard to wildlife. If the environment is to be preserved for future generations and continue to provide a renewable economic resource, the contaminants in sediments must be treated and/or contained in ways that eliminate current and potential exposure to people, wildlife, and aquatic organisms. Sources of sediment contamination include: discharges of municipal sewage; treatment facility upsets and overflows; storm water discharges from industrial and government facilities; direct industrial discharges of process waste; runoff and leachate from hazardous and solid waste sites; agricultural runoff and leachate; runoff from mining operations; runoff from industrial manufacturing and storage sites; and atmospheric deposition of contaminants.

For many years, the USEPA has been developing separate sediment guidelines that can be used to identify contaminated sediments. Such guidelines may also serve as a defensible basis for reducing risk by modifying sources of sediment pollution such as discharges or dredge-and-fill activities where dredging activities resuspend sediments. Therefore, we recommend strengthening Section III, General Standards, Stream Bottom Deposits, by adding specific guidelines (i.e., non-enforceable guidelines) that may indicate a change in the chemical, physical, and biological integrity of the sediments. We encourage the addition of the following sediment quality guidelines (Table 1) be added to this section in order to identify the concentration of certain toxic substances that may cause unacceptable ecological risk, assist in clean-up of existing sediment contamination, and to develop and consistently apply methodologies for analyzing contaminated sediments:

Table 1. Sediment Quality Guidelines Above Which Harmful Effects Are Likely to Be Observed in Aquatic Life (Source: MacDonald *et al.* 2000).	
Metals (milligrams per kilogram dry weight)	
Arsenic	33
Cadmium	4.98
Chromium	111
Copper	149
Lead	128
Mercury	1.06
Nickel	48.6
Zinc	459
Organic Chemicals (milligrams per kilogram dry weight)	
Total Polycyclic Aromatic Hydrocarbons	22.8
Total Polychlorinated Biphenyls	0.68

Selenium Criterion Recommendations for Aquatic Life and Wildlife Habitat
Below, the Service presents technical information based on laboratory and field studies, and decisions made by other regulatory agencies, justifying adoption of a more restrictive chronic selenium criterion of 2 micrograms per liter (μg/l) or less for the protection of aquatic life and wildlife resources.

The USEPA is required by the Clean Water Act to publish water quality criteria that are protective of wildlife and aquatic life. However, toxicity data used to derive these criteria rarely are from wildlife studies, and few of the published criteria have considered effects of contaminants to wildlife (Williams *et al.* 1989). It has generally been assumed that water quality criteria that are protective to aquatic life will offer adequate protection to more semi-aquatic wildlife (United States Government Accounting Office 1987). The USEPA chronic aquatic life criterion for selenium has two substantial limitations: 1) the national criterion did not completely account for selenium bioaccumulation, and 2) the criterion was not derived to protect wildlife using selenium-contaminated habitats (Wiltse 1991).

Environmental selenium cycling can result in greatly increased dietary levels of selenium becoming available to fish and birds. A small increase in waterborne selenium can result in disproportionately large elevations in selenium residues in fish and wildlife tissues. In 1987, citing environmental damage caused by coal fly-ash, the USEPA lowered the permissible level of chronic and acute waterborne selenium criteria from 35 μg/l to 5 μg/l and from 260 μg/l to 20 μg/l respectively, to provide increased protection of fish and aquatic life (USEPA

1987). However, field studies have documented that selenium can accumulate to adverse levels in tissues of fish and wildlife when waterborne selenium concentrations are 5 µg/l or less. Hermanutz *et al.* (1990) reported that sodium selenite applied at a concentration of 2.5 µg/l and allowed to bioaccumulate in an experimental stream food chain for 319 days resulted in significant adverse effects on bluegill (*Lepomis macrochirus*) larvae (e.g., a high incidence of lordosis [spinal deformities], and hemorrhaging) compared to matched control streams. Reported selenium concentrations in San Francisco Bay of 0.1 µg/l to 2.7 µg/l in water have resulted in adverse tissue levels in bivalves, bottom-feeding fish, and aquatic birds (Taylor *et al.* 1992). In power plant cooling reservoirs in the southeastern United States, the threshold for significant selenium bioaccumulation to adverse levels in the food chain was reported to be in the range of 2 to 5 µg/l waterborne selenium (Hamilton 1998; Lemly 1996a, 1996b, 1996c, 1986; 1985a; 1985b; Lemly and Smith 1987). Recent studies of selenium bioaccumulation in agricultural drainwater systems have shown that selenium may bioaccumulate to toxic levels in food-chain organisms when waterborne concentrations are in the 0.5 to 3.0 µg/l range (Barnum and Gilmer 1988; Frankenberger and Engberg 1998; Hallock *et al.* 1992; Hoffman *et al.* 1990; Lemly 1996a, 1996b, 1996c; Saiki 1990; Shroeder *et al.* 1988; Skorupa 1998a, 1998b; Skorupa and Ohlendorf 1991; Stevens *et al.* 1988).

Numerous researchers have utilized field and/or laboratory data on selenium bioaccumulation and dietary risk thresholds to predict waterborne adverse-effect thresholds for fish and wildlife ranging from 0.5 to 2.8 µg/l (CH2M Hill *et al.* 1993; Davis *et al.* 1988; DuBowy 1989; Lillebo *et al.*, 1988; Peterson and Nebeker 1992; Skorupa and Ohlendorf 1991). Lemly (1996a; 1996b; 1996c) reported that waterborne selenium concentrations of greater than 2 µg/l (total recoverable basis in 0.45 micron filtered samples) could be hazardous to the viability and long-term survival of fish and wildlife. Peterson and Nebeker (1992) used single species toxicity data, information on contaminant bioaccumulation in aquatic food webs, and energy-based estimates of contaminant exposure to sensitive birds and mammals to derive a protective threshold estimate for aquatic birds and mammals of about 1 µg/l waterborne selenium (on a dissolved basis). Using an energy-based selenium bioaccumulation model for aquatic birds, DuBowy (1989) determined that the chronic water quality criterion for selenium would need to be less than 2.8 µg/l to protect waterfowl reproduction. A University of California (UC) Committee of Consultants formed to evaluate the water quality objectives for the San Joaquin River Basin in California, and recommended a selenium criterion range between 1 and 1.5 µg/l waterborne selenium to be a conservative estimate of a no adverse effect level for fish and wildlife that took into account possible deleterious effects of selenium bioaccumulation (UC Committee of Consultants on San Joaquin River Water Quality Objectives 1988). Davis *et al.* (1988), using scientific data from selenium toxicity research and other literature, stated that "...a conservative water quality goal for the protection of aquatic organisms, a level where no adverse effects should occur, appears to be between 1.0 and 1.5 ppb [µg/l]." Lillebo *et al.* (1988) accounting for bioaccumulation, determined that a waterborne concentration of 0.9 µg/l selenium was necessary to ensure that no adverse effects would occur to aquatic life.

Because of the bioaccumulation potential of selenium in aquatic ecosystems, some states and countries have enacted or proposed standards for selenium that are more restrictive than EPA's freshwater chronic criteria of 5 µg/l (e.g., Behra *et al.* 1993; California Central Valley Regional Water Quality Control Board [CCVRWQCB] 1988a, 1988b; North Carolina Division of Environmental Management 1986; Taylor *et al.* 1992). For example, the California Regional Water Quality Control Board adopted a 2 µg/l waterborne selenium objective for water used in management of wildlife - wetlands habitat in the Grasslands Water District, San Luis National Wildlife Refuge Complex, and Los Banos State Wildlife Area, within the San Joaquin Valley of California (CCVRWQCB 1988b). The California San Francisco Bay Regional Water Quality Control Board has proposed an aggressive plan to reduce selenium discharges from oil refineries in San Francisco Bay by 90% in 9 years until selenium concentrations are: in ambient water - 0.47 µg/l (dissolved), in sediment - 1.5 ug/g in algae and other aquatic plants - 0.7 ug/g, and in bivalves - 3 ug/g. Switzerland has proposed to adopt the 1 µg/l (total dissolved) waterborne selenium standard now applied for running waters in Canada (Behra *et al.* 1993). In addition, the USEPA is in the process of developing wildlife criteria for selenium and expects publication of a new aquatic life criterion in 2003.

In summary, the following points on selenium can be made:

- The USEPA freshwater chronic criteria for selenium of 5 µg/l does not adequately account for environmental bioaccumulation through the food-chain.

- Field studies have documented that waterborne selenium concentrations of 5 µg/l or less can result in adverse effects to aquatic fish and wildlife resources.

- Researchers utilizing field and laboratory toxicity data on selenium have recommended a chronic selenium criteria of 0.5 to 2.8 µg/l in freshwater for fish and wildlife protection.

- Several states/countries have proposed/adopted standards for waterborne selenium of 2 µg/l or less.

Therefore, the Service urges the Pueblo of Isleta to adopt a chronic numeric standard for selenium of 2 µg/l or less for the designated uses of "fisheries" and "wildlife habitat." The Service believes that adoption of a chronic selenium standard of 2 µg/l or less is needed to protect the fishery and wildlife resources of the Pueblo of Isleta, and is scientifically justifiable.

Thank you for the opportunity to comment on the Pueblo of Isleta amended water quality standards. If you have questions or require additional information, please contact Joel D. Lusk of my staff at (505) 346-2525, extension 109, or at the letterhead address.

Sincerely,

for Cynthia D. Albright

Joy E. Nicholopoulos
Field Supervisor

cc:
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